



U.S. Department of Transportation
Federal Highway Administration

Priority, Market-Ready Technologies and Innovations

Improved Decisionmaking Using Geographic Information Systems

Problem: Integrating geographic information into the transportation decisionmaking process can be difficult

Transportation planners must incorporate a wide diversity of information into the planning process; however, this information often takes time to collect, is not centralized, and is not easily presentable. An accessible information tool would be very helpful in the planning, scoping, permitting, and evaluating processes associated with transportation decisionmaking.

Putting It in Perspective

By using GIS to bring together information more efficiently, transportation planners are in a better position to review, analyze, and understand the problems they are addressing. This efficiency can save time and money, and a better understanding of information can lead to improved decisionmaking.

Solution: Geographic Information Systems (GIS) can inform transportation planning

What is GIS?

GIS is a system of computer hardware and software that collects, stores, analyzes, and disseminates information about areas of the earth. While GIS often helps create maps, GIS can also maximize the quality and use of spatial data analysis to help answer questions of where, how far, how many, what size, and within what area.

Why is GIS useful?

GIS can offer significant advantages over conventional computer programs. It allows geographers to collate and analyze information much easier than is possible with traditional research techniques. GIS technology is a general tool that can be used across a wide range of transportation applications. It allows staff to visualize the spatial relationships among any geographically referenced features (such as clusters of highway crashes and roadway characteristics). It facilitates integration of different databases based on geographic proximity (for example, GIS technology can identify the total population residing within a metropolitan planning area, but outside the urbanized area). It also helps transportation staff present findings to policymakers and the general public using visually attractive and understandable thematic maps.

Successful Applications: States get results from GIS

The Florida Department of Transportation's (DOT) Efficient Transportation Decision Making (ETDM) process links land use, transportation, and environmental resource planning initiatives by actively involving agencies and the community. ETDM identifies critical issues early in the planning phase to reduce conflicts among permitting agencies. The process uses state-of-the-art technologies, including GIS and Web-based communication tools, to allow team members to communicate more effectively. Technologies such as these will improve decisionmaking and may significantly reduce the time, effort, and cost required to implement transportation plans while helping to protect human and natural environments.

The Indiana DOT, in association with the Indiana Geological Survey, compiled a GIS application for long-range planning and to help develop projects under the National Environmental Policy Act. The application includes more than 170 different geospatial data layers, ranging from environmental

resources to socioeconomic, historical, and geologic feature data. Data originally was selected from several State and Federal agencies, and was edited and formatted. This application was first used in southwestern Indiana to help complete a Tier 1 Environmental Impact Statement for the U.S. Interstate 69 project. The data coordination effort was so effective that a Statewide GIS expansion has been completed. The Indiana GIS application will streamline future project development and reduce staff workload and fiscal demands.

Washington State and Washington State DOT have become national leaders in developing innovative methods to share geographic data. One such method is the Environmental GIS Workbench, managed by the Washington State DOT's Environmental Information Program (EIP). The Environmental GIS Workbench is a custom-built application that provides access to a broad range of Statewide environmental and natural resource management data. The EIP supports the GIS application by coordinating with numerous Federal, State, and local agencies to ensure that datasets are updated continuously and remain accurate. The increased availability of information has reduced decision review time, while EIP-centralized system control maintains and improves data accuracy. The digitized data layers are available as ArcView™ readable files and may easily be downloaded, overlaid, and manipulated.



A screenshot of Florida DOT's Environmental Screening Tool, which allows viewers to see where proposed transportation projects will be located with respect to nearby land uses and environmentally sensitive areas

Benefits

- Encourages partnership/data sharing.
- Identifies potential problems early in the planning process.
- Focuses on key technical issues.
- Provides agencies and communities with access to quality data.
- Improves feedback with summary reports and maps.

Additional Resources

The Federal Highway Administration recently updated its National Highway Institute training course, "Applying Spatial Data Technologies to Transportation." To learn more about Florida's ETDM, visit www.dot.state.fl.us/emo. Additional information about Indiana's GIS application is available at <http://igs.indiana.edu/arcims/index.html>. For more information about Washington State's Environmental GIS Workbench, visit www.wsdot.wa.gov/environment/eao/envinfo/egwbhome.htm

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